lene glycol in the vehicle and its associated low pH rather than from the drug itself. A new formulation with less propylene glycol is in development and may eliminate this problem. Beclomethasone is available as a freon-propelled metered-dose unit (Beconase, Vancenase) and an aqueous formulation (Beconase AQ, Vancenase AQ). The pump sprays that use the aqueous formulation appear to provide better distribution of the drug compared with the aerosol, although few studies have directly compared the mode of delivery, and clearly both preparations relieve symptoms relative to placebo. Certain patients prefer the freon-propelled aerosol delivery system because there is less medication run-off than with an aqueous formulation. Triamcinolone (Nasacort) is available as a freon-propelled aerosol with a slightly different nasal adaptor delivery device from the aerosol version of beclomethasone.

Local nasal irritation is the major side effect of intranasal corticosteroids. This problem is usually not important and rarely prevents a patient from complying with the regimen. About 1% to 2% of patients will have a bloody discharge, and septal perforations have been rarely detected. Biopsies of the nasal mucosa of patients who have received beclomethasone continuously for at least five years have shown no signs of atrophy or metaplasia. Systemic side effects have not been detected in clinical trials using the three synthetic steroid preparations, although if carefully looked for, systemic absorption and even some mild effects on the hypothalamic pituitary-adrenal axis can be measured. Recent data from studies of corticosteroid therapy for asthma suggest that long-term inhaled corticosteroid therapy may be associated with adrenal atrophy, decreased bone formation, impaired growth, and cataract formation, but all of these findings are the subject of dispute. The patient at greatest risk for complications is anyone, particularly a child, being treated with inhaled steroids for both asthma and rhinitis and therefore receiving an overall considerable dose of inhaled steroid, possibly leading to sizable systemic absorption and resulting steroid side effects. Although the risks of systemic effects accruing from the long-term use of intermediate or high doses of corticosteroids need further study, it can be argued that, given the available information, corticosteroids at standard doses are a valuable tool in the management of several types of rhinitis with an acceptable risk-to-benefit ratio.

New corticosteroid preparations on the horizon include budesonide and fluticasone propionate. Both have a high ratio of topical to systemic activity over a wide dose range and appear at least as effective as beclomethasone and flunisolide in the treatment of allergic rhinitis, offering a therapeutic alternative to currently available agents. Because chlorofluorohydrocarbons will be banned in the near future, powder-type corticosteroids are being studied and may represent a new delivery system.

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Latex Allergy

LATEX IS THE MILKY SAP obtained from numerous plants, predominantly the rubber tree (*Hevea brasiliensis*), and is used in the manufacture of natural rubber products for both medical and nonmedical uses. Products containing natural rubber include surgical, examination, and cleaning gloves, condoms, balloons, catheters, rubber bands, and elastic adhesives used in dentistry. Synthetic rubber products (derived from petroleum and alcohol) are increasingly being used and do not contain latex.

Two types of allergic reactions to latex-containing products have been described. Contact dermatitis (T cell-mediated, type IV hypersensitivity) from exposure to rubber products, especially gloves, has been recognized for decades. This immunologic reaction is not against latex antigens but to sensitizing chemicals added during the manufacturing process, such as mercaptobenzothiazole or tetramethylthiuram. This reaction can be determined by patch testing for the relevant additives.

Since 1979, there have been an increasing number of reports in the medical literature of immunoglobulin (Ig) E-mediated allergic reactions (immediate, type I hypersensitivity) to latex-containing products. Clinical reactions have included local contact urticaria, systemic urticaria, rhinoconjunctivitis, asthma, or anaphylaxis. Most dramatic have been reports of intraoperative anaphylaxis from exposure to surgical gloves and other latex-containing products and anaphylactic reactions from rubber-tipped enema catheters. Exposure to latex allergen has usually been at mucosal surfaces but can also be from other cutaneous, percutaneous, and parenteral transmission. Aerosol transmission has also been described and is postulated to be caused by latex allergen adhering to cornstarch released into the air with the manipulation of rubber gloves.

The prevalence of IgE-mediated latex allergy in the general population is not known but appears to be low, less than 1%. Allergic reactions to latex are more often seen in atopic persons, and those with prolonged or repeated exposure to latex products are at increased risk. Between 18% and 28% of children with myelodysplasia have a history of acute allergic reactions to rubber products. A serologic survey of similar patients revealed 34% to have rubber-specific IgE by radioallergosorbent test (RAST). Children with congenital urologic abnormalities also have an increased risk of IgE-mediated latex allergy; in both of these groups, the allergy presumably is from frequent urinary bladder or bowel catheterization and multiple surgical procedures. Those with occupational exposure to rubber products, such as health care professionals or rubber-industry workers, also are at an increased risk related to the amount of exposure. In a study of

employees of a university hospital in Finland, 1 of 130 (0.8%) workers not involved in health care were found to have immediate hypersensitivity to latex, whereas 2.9% of all physicians and nurses in the hospital had IgE-mediated sensitivity and 5.6% of nurses and 7.4% of physicians in the operating room were sensitive. Another study has shown about 11% of surgical nurses to have latex allergy.

The evaluation of patients for IgE-mediated latex allergy is done by either epicutaneous testing or in vitro testing. The largest study done in more than 900 health care professionals showed 100% sensitivity and 99% specificity of epicutaneous testing. Anaphylactic reactions to skin testing have been reported, though rarely. There are no US Food and Drug Administration-approved extracts available in the United States, although skin testing can be done with natural latex or with rubber products such as gloves. The amount of allergen in latex products varies with different manufacturers and even different lots, so they are an unreliable testing source. There is a commercial extract for skin testing available in Canada. In vitro tests are commercially available in the United States, but most studies have shown RAST testing to be less sensitive than skin testing. The specific latex allergens have been incompletely characterized to date.

We need to be able to identify patients at risk for latex allergy before surgical, medical, radiologic, or dental procedures. Rubber-allergic health care professionals also need to be able to work in a latex-free environment. Because no test is currently accepted for availability, reliability, and safety, a history of a possible allergic reaction is the only factor available in identifying at-risk patients. Recommendations have been to test any high-risk patients by skin testing, if available, or by in vitro testing. Patients with evidence of IgE-mediated sensitivity to latex or any history of previous latex allergic reaction should strictly avoid all latex products. The predictive value of a positive skin test or in vitro test in patients with no history of latex allergy is unknown, and large prospective studies are needed before further recommendations can be made. There have been no controlled trials done, but prophylactic premedication with histamine-1 and -2 antihistamines and parenteral steroids (similar to recommendations for radiocontrast media reactions) can be tried in patients known to be sensitive. There have been reports of the failure of premedication in patients with parenteral infusion of latex proteins. The avoidance of latex products is preferable.

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